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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

CURS, NATHAN M

ART UNIT

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2613

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/639,587	Applicant(s) OKUNO, TOSHIAKI	
	Examiner NATHAN M. CURS	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4,8,9,15,19 and 20 is/are allowed.
- 6) ☒ Claim(s) 1-3,5-7,10-14,16-18,21 and 22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/07,5/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 5, 12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al. ("Zhou") (US Patent Application Publication No. 2002/0021862), in view of Deng et al. ("Deng") (US Patent Application Publication No. 2002/0196491), and further in view of Essiambre et al. ("Essiambre") (US Patent Application Publication No. 2004/0208617), and further in view of Miller (US Patent No. 6044189).

Regarding claims 1 and 12, Zhou discloses an optical transmission system, comprising: an optical transmitter including a light source, said optical transmitter outputting signal light in a signal wavelength band and an optical receiver receiving the signal light outputted from said optical transmitter (fig. 1 and paragraph 0028); an optical fiber transmission line for transmitting the signal light outputted from said optical transmitter as a transmission medium provided between said optical transmitter and said optical receiver, said optical fiber transmission line having a positive chromatic dispersion at an operation wavelength of said direct modulation light source (fig. 1 and

paragraphs 0034 and 0035); and at least one non-temperature controlled dispersion compensator provided on an optical path either between the signal outputting end of said optical transmitter and the signal entering end of said optical fiber transmission line (fig. 2c and paragraphs 0056 and 0057) or between the signal receiving end of said optical receiver and the signal emitting end of said optical fiber transmission line (fig. 2a and paragraphs 0037-0040). Zhou discloses a WDM system but does not disclose that the system is CWDM or that the optical transmitter light source is a non-temperature controlled direct modulation CWDM light source. Deng discloses that inexpensive, non-temperature controlled lasers in WDM systems can be used with sufficient wavelength spacing (abstract and paragraph 0016). It would have been obvious to one of ordinary skill in the art at the time of the invention to use non-temperature controlled lasers and sufficient wavelength spacing in the WDM, resulting in a CWDM system, to avoid the additional cost associated with temperature controlled lasers, as taught by Deng. Zhou discloses that the dispersion after compensation is zero or a predetermined value of residual dispersion (paragraph 0040) and discloses a wavelength range for the dispersion compensation is a range without a zero-dispersion wavelength of said transmission line (fig. 2e and paragraph 0042), but does not explicitly disclose that, at either the signal emitting end of said optical fiber transmission line or at the signal receiving end of said optical receiver, respectively, the accumulated chromatic dispersion at the operation wavelength is set to negative. Essiambre discloses that using small negative residual dispersion results in better transmission performance than zero or slightly positive residual dispersion (paragraphs 0030, 0039 and 0040). It would

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have been obvious to one of ordinary skill in the art at the time of the invention to use dispersion compensation that produces small negative residual dispersion for the system of Zhou, in order to achieve the best transmission performance, as taught by Essiambre. Zhou does not disclose that the system operates over a temperature range of 0°C. to 60°C; however, Miller discloses that normal operating temperature for optical fiber system is -40.degrees.C to 80.degrees.C (col. 1, lines 16-19 and col. 4, lines 47-51). It would have been obvious to one of ordinary skill in the art at the time of the invention to operate the system of Zhou within the range of 0.degrees.C to 60.degrees.C since this is one of numerous acceptable operating ranges for an optical fiber system based on the teaching of Miller.

Regarding claims 5 and 16, the combination of Zhou, Deng, Essiambre and Miller discloses a CWDM optical transmission system according to claims 1 and 12, wherein said optical fiber transmission line includes a single-mode optical fiber (Zhou: paragraph 0034), which inherent has a zero-dispersion wavelength of near 1.3 μm .

3. Claims 2, 3, 6, 7, 13, 14, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al. ("Zhou") (US Patent Application Publication No. 2002/0021862), in view of Deng et al. ("Deng") (US Patent Application Publication No. 2002/0196491), and further in view of Essiambre et al. ("Essiambre") (US Patent Application Publication No. 2004/0208617), and further in view of Miller (US Patent No. 6044189) as applied to claims 1, 5, 12 and 16 above, and further in view of

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Kartalopoulos ("Introduction to DWDM Technology"; IEEE Press; 2000; pages 50, 51 and 55).

Regarding claims 2 and 13, the combination of Zhou, Deng, Essiambre and Miller discloses a CWDM optical transmission system according to claims 1 and 12, further comprising a demultiplexer for demultiplexing a plurality of signal channels propagating through said optical fiber transmission line into one signal channel group in a first wavelength band and the other signal channel group in a second wavelength band (Zhou: fig. 2a), wherein said dispersion compensator compensates for the accumulated chromatic dispersion in the signal channel group of the second wavelength band (paragraphs 0037-0040), and wherein, at the signal outputting end of said dispersion compensator, the accumulated chromatic dispersion in one of the signal channels of the second wavelength band passing through said dispersion compensator is negative over the temperature range of 0°C to 60°C (Essiambre: paragraphs 0030, 0039 and 0040, and Miller: col. 1, lines 16-19 and col. 4, lines 47-51, as applicable in the combination). The combination of Zhou, Deng, Essiambre and Miller discloses WDM and EDFAs, but does not disclose that the first wavelength band includes a zero-dispersion wavelength of said optical fiber transmission line. However, Kartalopoulos discloses using dispersion-shifted fiber with a WDM system having a zero-dispersion point shifted at 1550 nm (pages 50 and 51, section 3.13). It would have been obvious to one of ordinary skill in the art at the time of the invention to use DSF with the WDM system of the combination, in order to provide the benefit of using fiber that is designed

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to be compatible with amplifiers that operating in the 1550 nm range for WDM, such as EDFAs.

Regarding claims 3 and 14, the combination of Zhou, Deng, Essiambre, Miller and Kartalopoulos discloses a CWDM optical transmission system according to claims 2 and 13, wherein, at the signal outputting end of said dispersion compensator, the accumulated chromatic dispersion in all the signal channels of the second wavelength band passing through said dispersion compensator is negative over the temperature range of 0° C. to 60° C (Essiambre: paragraphs 0030, 0039 and 0040, and Miller: col. 1, lines 16-19 and col. 4, lines 47-51, as applicable in the combination).

Regarding claims 6 and 17, the combination of Zhou, Deng, Essiambre and Miller discloses a CWDM optical transmission system according to claims 1 and 12, but does not disclose that said optical fiber transmission line, at a wavelength of 1.38 μm , has a transmission loss smaller than a transmission loss at a wavelength of 1.31 μm . Kartalopoulos discloses AllWave fiber, based on SMF with the OH radical removed, and where loss at 1380 nm is less than at 1310 nm (fig. 3.16 and page 55). It would have been obvious to one of ordinary skill in the art at the time of the invention to use AllWave fiber, to provide the benefit of more wavelengths available in the transmission spectrum, due to the removal of the OH radical impact on transmission loss.

Regarding claims 7 and 18, the combination of Zhou, Deng, Essiambre and Miller discloses a CWDM optical transmission system according to claims 1 and 12, but does not disclose that said optical fiber transmission line has a zero-dispersion wavelength which exists in a wavelength range of 1.35 μm to 1.5 μm . However, it

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would have been obvious to one of ordinary skill in the art at the time of the invention to combine Kartalopoulos with the combination as described above for claims 2 and 13.

4. Claims 10, 11, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al. ("Zhou") (US Patent Application Publication No. 2002/0021862), in view of Deng et al. ("Deng") (US Patent Application Publication No. 2002/0196491), and further in view of Essiambre et al. ("Essiambre") (US Patent Application Publication No. 2004/0208617), and further in view of Miller (US Patent No. 6044189) as applied to claims 1, 5, 12 and 16 above, and further in view of Gabitov (US Patent Application Publication No. 2002/0048070).

Regarding claims 10 and 21, the combination of Zhou, Deng, Essiambre and Miller discloses a CWDM optical transmission system according to claims 1 and 12, but does not disclose pumping light supply means for supplying Raman-amplification pumping light into said optical fiber transmission line, so as to Raman-amplifying the signal light propagating through said optical fiber transmission line. Gabitov discloses opening up the 1300 nm range for WDM transmission in a WDM system by using Raman amp with a pumping light center at 1240 nm (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a Raman amp with a pump light centered at 1240 nm in the system of the combination, to provide the benefit of opening the 1300 nm transmission window for greater WDM transmission, as taught by Gabitov.

Regarding claims 11 and 22, the combination of Zhou, Deng, Essiambre, Miller and Gabitov discloses a CWDM optical transmission system according to claims 10 and 21, wherein said pumping light supply means supplies the Raman-amplification pumping light of a plurality of pumping channels included in a wavelength range of 1.2 μm to 1.3 μm into said optical fiber transmission line (Gabitov: abstract, as applicable in the combination).

Allowable Subject Matter

5. Claims 4, 8, 9, 15, 19 and 20 are allowed.

Response to Arguments

6. Applicant's arguments filed 17 April 2008 have been fully considered but they are not persuasive.

In the Remarks page 16 lines 25-27, the Applicant asserts that the cited references do not teach that the direct modulation light source is a non-temperature controlled one and that the dispersion compensator is also a non-temperature controlled one. To the contrary, as applicable in the combination, the direct modulation light source of Deng is not temperature controlled (see Deng abstract and paragraph 0016), and the dispersion compensator of Zhou is not temperature controlled (see Zhou fig. 2c and paragraph 0056 and 0057; see also paragraph 0061)

In the Remarks page 17 lines 14-17, the Applicant argues that if a non-temperature controlled direct modulation light source is applied to Zhou's "DWDM"

system, the system becomes unstable; the Applicant bases this argument on the premise that the wavelength spacing of Zhou's DWDM system is narrow by way of being DWDM (see the Remarks page 16 lines 17-19). However, this argument is not persuasive with respect to the combination of Zhou and Deng because the combination, as described above, includes the use of sufficient wavelength spacing for non-temperature controlled direction modulation light sources. Thus the combination does not have the narrow wavelength spacing that the Applicant argues would result in instability.

In the Remarks page 17 line 18 to page 18 line 2, the Applicant argues that changing the wavelength spacing of Zhou based on Deng would change Zhou's system from DWDM to CWDM such that Zhou's system cannot achieve a high speed DWDM transmission. This argument is not persuasive because the intended purpose of Zhou does is not narrow wavelength spacing. Rather, the intended purpose of Zhou is multi-wavelength optical transmission of high bit-rate signals, with improved dispersion compensation to achieve longer transmission distances; the impact of dispersion for high bit rate optical signals is tied to the high bit rate signals themselves, not the spacing between wavelengths. Further, while changing the wavelength spacing of Zhou based on Deng, as described, would indeed result in Zhou having CWDM wavelength spacing, this would not change the individual high speeds of the wavelength signals themselves (i.e. the bit rates), and would not even necessarily reduce the total number of wavelengths used for the system either, because Zhou is not concerned with either a specific number of wavelengths or a specific wavelength spacing.

In the Remarks page 18 lines 3-11, the Applicant makes multiple inaccurate generalizations about CWDM and DWDM. First the Applicant implies that CWDM must span the S, C, and L bands. However the Applicant presents no evidence that CWDM must span all three of these bands. Further, the Applicant asserts that DWDM systems are limited to just one of these bands. To the contrary, C+L band DWDM systems (e.g. NEC's Spectralwave series of DWDM equipment) were already legacy systems by the time of the Applicant's filing and were well known even before Zhou's filing. The Applicant further asserts (including in Remarks page 19 lines 2-5) that the dispersion setting and characteristics in CWDM are different than in DWDM. To the contrary, as already described above, dispersion affects the adjacent bits of individual high speed optical signals, and is not tied to wavelength spacing; the dispersion wavelength curve over e.g. C+L bands is a characteristic of the transmission fiber itself, regardless of the wavelength spacing used for transmission.

In the Remarks page 19 lines 7-18, the Applicant argues that the claimed temperature range is not an operation temperature for the CWDM system, and is instead an environmental condition. Thus, the Applicant seems to interpreting the role of Miller in the combination as addressing the heat created by the optical fiber system equipment itself. This is not the case, and one of ordinary skill in the art would readily recognize that the "operating temperature" addressed by Miller, and as applied in the combination, is the environmental temperature range within which the equipment operates; Miller is not addressing the heat generated by optical equipment itself. The Applicant further argues that the present application address the issues as to whether a

temperature-stability can be maintained or not even when the system operation temperature is set at any temperature within the room temperature. However, the specification says nothing about maintaining a temperature-stability, and says nothing about room temperature. The specification only provides an environmental temperature range within which the Applicant's accumulated dispersion, etc. remains negative.

In the Remarks page 20 lines 3-13, the Applicant argues that the claimed temperature range of 0°C to 60°C is not the temperature range in which the dispersion compensating module itself is used. Since the claim recites that the accumulated dispersion is negative over a temperature range of 0°C to 60°C, the Applicant appears to be arguing that the claimed temperature range of 0°C to 60°C only applies to the environmental of the pin-point location where dispersion accumulation ends, and nowhere else. This does not make sense in the real world, nor does the specification support or explain how it could be possible to have such an isolated and segregated environmental temperature at only one pin-point location along the system span, to the exclusion of all other locations. In any case, the environmental temperature range provide by Miller in the combination applies to the entire system, and thus to all possible locations in the system, including the pin-point location where dispersion accumulation ends.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

8. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pairedirect.uspto.gov>. Should you

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have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/N. M. C./

Examiner, Art Unit 2613

/Jason Chan/

Supervisory Patent Examiner, Art Unit 2613